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Global Issues Affecting the 1990s Health Agenda

Technology Assessment in Medicine

Potential for Using Non-physicians

Health of the Computer-based Patient Record

R.N.–M.D. Preceptorship

Changing the Process of Selecting Residents

Experts versus Non-experts:

Effects in Problem-based Learning

Effects on Process and Students' Performance

Training and Graduates' Entering Primary Care

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Skills in Alcohol-abuse Interviewing and Treatment

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Recommendations for Changing the Residency Selection Process Based on a Survey of Program Directors

NORMA E. WAGONER, Ph.D., and J. ROBERT SURIANO, Ph.D.

Abstract—The authors conducted a nationwide survey of program directors participating in the 1990–91 National Resident Matching Program (NRMP) in order to solicit the directors' responses to elements of the current residency selection process and to suggested revisions. Of 680 randomly selected directors, 469 (69%) responded to the survey questionnaire, using a five-point scale, from 1, indicating strong agreement, to 5, indicating strong disagreement. The directors agreed that the senior year was distorted by the selection process, that students were pressured into making early career decisions, and that there needed to be more structure to the senior year. The directors were also in agreement that interviews, the NRMP, and the uniform notification date were working well. But deans' letters, other letters of recommendation, the Universal Application, and appointment of unmatched students were considered to be in need of improvement. The development of a centralized residency application service with the electronic transmission of data received the directors' support. The authors recommend that a task force be convened to consider changes that would improve the selection process and would reduce disruption of the students' senior year of medical education. *Acad. Med.* 67 (1992): 459–465.

During the last several years, there has been an increasing desire to improve the quality of the senior year of medical school by reducing the disruption caused by the redundant and excessive requirements of a demanding residency selection process. There has been a desire not only to improve the efficacy of the selection process but also to assure that program directors receive significant information about their applicants at an appropriate time.[1]

In 1988, the Association of American Medical Colleges' (AAMC's) Committee on Graduate Medical Education provided guidelines for the content and format of deans' letters in order to provide better and more standardized evaluative information.[2] At the same time, the Council of Deans sanctioned the November 1 release data for the dean's letter.

Several areas of the residency selection process warrant consideration for revision that might improve the process. Based on our experience, we identified the following areas as being appropriate for further investigation:

1. Further improvement of the content of deans' letters.[3–5] The magnitude of the task involved in the preparation of the dean's letter and its mailing on a given date requires the allocation of significant resources. This can be justified only if program directors find the content sufficiently valuable to use in their selection process.

2. Transmission of the dean's letter at a time suitable for decision making by program directors. The current date for transmission of the dean's letter has led some program directors to schedule interviews before they receive deans' letters.

3. Assessment by program directors of the predictive value of scores on the MCAT (Medical College Admission Test) and on the ACT (American College Testing) Assessment or SAT (Scholastic Aptitude Test). Requests for MCAT scores and SAT or ACT scores have been on the rise among program directors in surgery subspecialties. Often students are required to mail an increasing number of "certified" copies of scores. Now that the National Board of Medical Examiners provides only a single score on its United States Medical Licensing Examination, will there be an increasing number of program directors who will seek high school, college, or other premedical data?

4. Development of guidelines to improve the quality of the selection interview.[6] Many students report being questioned about family plans and other personal matters in a manner that may have questionable legality.

5. Development of a system to schedule interviews. Directors faced with large numbers of places to fill and many applications to process,

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and who value the dean's letter as integral to selecting students for interviews, find that the timing tends to place interviews during the Thanksgiving, Christmas, and New Year's Day holidays, which are not only the most expensive times to travel, but also are difficult ones for the securing of sufficient faculty to do the interviews. A system also would facilitate better use of student time, and would enable fuller use of the senior year while reducing costs.

6. Adoption of an improved Universal Application.[7] Choice of the Universal Application by directors has been highly variable. When program directors have selected the Universal Application, students appreciate that their time is made more efficient. When students receive a variety of applications, they often complain that they must provide the same information in several different ways. In addition, information that the student has provided on the curriculum vitae or personal statement is often required on applications in ways that are redundant. Students question why the curriculum vitae and the personal statement could not be an integral part of the Universal Application.

7. Reevaluation of the role of audition electives.[8–10] Results of the 1990 AAMC Medical Student Graduation Questionnaire[11] show that nearly 30% of the responding students were encouraged to take a specialty rotation in the institution where they hoped to be considered, in order to enhance their chances for the residency position. 1990 AAMC questionnaire data denote that 12.3% of the students took two or more electives at institutions other than their own schools.

8. Development of a system for the unmatched student. The unmatched-student process has been described as "chaotic and unfair" by students, program directors, and deans of students. A significant number of decisions are being made via telephone on the day before the Match. However, more information is now being demanded of candidates from some specialties, and entire files are now being requested via fax, with resultant "fax jam." In some instances, students are requested to travel to programs for interviews, creating more expense and less timeliness in the unmatched-student process.

We then surveyed program directors regarding their views about the concerns we had identified. The survey acquired particular importance because program directors have no formal representative organization and any changes to the residency selection process would necessarily require input from all constituencies. This was the first survey of a broad range of program directors on the topic of considering further modifications to the selection process.

Method

A questionnaire was developed that centered on the identified concerns, and it was mailed in July 1990 to 680 randomly selected program directors who were participating in the 1990–91 National Resident Matching Program (NRMP). In order to obtain a representative sample of the participating programs, we chose every other program director from an alphabetical list of a total of nearly 1,400. Care was taken to avoid any selectivity bias toward university or community hospitals. All specialties were sampled.

Responses were obtained from programs representing every specialty participating in the NRMP, including 32 directors of medical education. The questionnaire was designed to address issues pertinent to the directors' degrees of satisfaction or dissatisfaction with the residency selection process and whether they were interested in using advanced technology to develop a more streamlined process. The questionnaire allowed for open-ended comments. These comments provided additional valuable insights about program directors' concerns. Preliminary results were reported at the October 1990 AAMC annual meeting's Forum on the Transition from Medical School to Residency. The final results are contained in this report.

The program directors were asked to respond to each question using a five-point Likert scale, where 1 represented strong agreement, 3 represented neither agreement nor disagreement, and 5 indicated strong disagreement. The program directors were asked to rate statements under each of the following headings: (1) general overview of the major elements of the residency selection and application process, (2) the dean's letter, (3) the Universal Application, (4) the impact of the process on undergraduate medical education, (5) the cognitive selection parameters, (6) the interview, and (7) possible future developments.

The response rate was 68.9% with 469 program directors returning surveys. All the responses were combined for analysis, independent of specialty or hospital type. For each item, a mean response was calculated and used to assess the degree to which the program directors expressed agreement or disagreement on the particular components of the residency selection process.

Results and Discussion

If there is a consensus that the residency selection process has a disruptive influence on undergraduate medical education, then appropriate corrective measures ought to be implemented as expeditiously as possible. The results of our survey show that there is such an agreement now.

Table 1 shows the directors' mean responses and the percentages of their responses in the order of strength of agreement to issues concerning the residency selection process. A neutral mean response (2.93, SD, 0.87) was obtained to the question of whether students arrive at their residency program with well-integrated clinical knowledge. Many program directors evidently assessed their new residents as deficient in this area. It would be natural to question whether students' concerns during the senior year to complete a large number of different application forms, take several audition electives, and devote considerable time over two to three months to interviewing

Table 1

Mean Ratings and Percentages of Responses to Issues Concerning Residency Selection, as Reported by a National Sample of 469 Program Directors in the 1990–91 NRMP*

Item	% Respondents Giving Rating					Mean Rating	(SD)
	Strongly Agree: 1	Agree: 2	Neutral: 3	Disagree: 4	Strongly Disagree: 5		
Senior year distorted by selection process	31	37	22	6	4	2.14	(1.04)
More structure needed in senior year	29	38	23	7	3	2.18	(1.03)
Students pressured too early for career choice	35	26	21	15	4	2.28	(1.20)
Lack of coordination in process leads to loss of educational time	20	35	32	11	3	2.42	(1.01)
Residents begin with well-integrated clinical knowledge	3	30	42	22	3	2.93	(0.87)

*In July 1990 the authors conducted a nationwide survey of program directors participating in the National Resident Matching Program (NRMP) in order to solicit the directors' responses to elements of the current residency selection process and to suggested revisions. Of 680 randomly selected directors, 469 (69%) responded to the authors' questionnaire. The table above shows the directors' responses concerning major issues involving the selection process, in order of strength of agreement. All percentages are rounded.

has a deleterious effect on students' abilities to integrate clinical knowledge.

When program directors were asked if they felt the senior year was distorted by the selection process, the mean response (2.14, SD, 1.04) was one of agreement. It was not surprising that the directors wanted more structure in the fourth year (2.18, SD, 1.03). Many of the program directors counseled senior medical students, and when asked whether seniors were pressured too early into making career decisions, their mean response was one of agreement (2.28, SD, 1.20).

For most medical schools, the residency selection process begins in the junior year as students select fourth-year electives. The process intensifies as the students move into the senior year, and it continues until the Match lists are entered into the National Resident Matching Program's (NRMP's) computerized Rank Order List Input and Confirmation System (ROLIC), usually ten or 11 months later. For students applying to specialties outside the NRMP, more time is needed to obtain both first-year and second-year positions. Students in general are often limited to participating in fewer stringent electives during the months of December and January, but for those students applying outside the NRMP, November is included as well. When asked about the lack of coordination of the residency selection process and whether this created lost educational time for students, program directors agreed (2.42, SD, 1.01).

Table 2 shows the program directors' mean responses and the percentages of their responses to whether

Table 2

Mean Ratings and Percentages of Responses to Whether General Elements of the Residency Selection Process Work Well, as Reported by a National Sample of 469 Program Directors in the 1990–91 NRMP*

Item	% Respondents Giving Rating					Mean Rating	(SD)
	Strongly Agree: 1	Agree: 2	Neutral: 3	Disagree: 4	Strongly Disagree: 5		
Interviews	53	34	10	2	1	1.65	(0.83)
Notification of Match results	42	39	12	5	2	1.85	(0.93)
National Resident Matching Program	36	39	17	6	3	2.01	(1.01)
Interview time frame: Nov. 1–Feb. 1	22	43	16	13	6	2.38	(1.14)
Dean's letter	15	40	28	12	4	2.51	(1.03)
Other letters of support	10	37	34	16	2	2.64	(0.95)
Use of NBME scores	12	35	34	15	3	2.66	(1.37)
Universal Application	18	29	28	17	8	2.68	(1.19)
Unmatched-student process	11	31	31	18	9	2.83	(1.12)
Early specialty matches (non-NRMP)	9	18	30	22	21	3.28	(1.24)

*In July 1990 the authors conducted a nationwide survey of program directors participating in the National Resident Matching Program (NRMP) in order to solicit the directors' responses to elements of the current residency selection process and to suggested revisions. Of 680 randomly selected directors, 469 (69%) responded to the authors' questionnaire. The table above shows the directors' responses concerning whether general elements of the process work well, in order of strength of agreement. All percentages are rounded.

general elements of the residency selection process were working well. Previous studies by the authors[3,10,12] revealed that the interview process was considered to be very important in providing information essential to resident selection. In the current questionnaire, program directors were asked if they perceived interviews to be working well. Their mean response (1.65, SD, 0.83) was one of the strongest responses of agreement obtained. However, many program directors offered comments regarding the mechanics of the process, explaining that interviewing, in the words of one director, was "extremely time consuming, and that it was often difficult to be fair when so many applicants were applying for so few places." The timing of interviews from November 1 to February 1 appears to have been supported (2.38, SD, 1.14), although several program directors thought it was "horrible," "dragged out the season" and "needed to be shortened further."

When asked whether the dean's letter served them well, the directors gave a mean response that approached neutrality (2.51, SD, 1.03). In other areas, such as other letters of support (2.64, SD, 0.95), use of NBME scores as supportive in the selection process (2.66, SD, 1.37), and the use of the Universal Application (2.68, SD, 1.19), the mean responses were similar to those for the dean's letter, suggesting that more effort was needed to improve these areas. The notification of Match results (1.85, SD, 0.93) and the NRMP (2.01, SD, 1.01) were considered to be working well.

The processes outside the NRMP were considered to work less well. The mean response to a question about the unmatched-student process suggests a low level of satisfaction (2.83, SD, 1.12). Some program directors commented that the process was brutal and haphazard. When questioned about how well the early non-NRMP specialty matches served them, the directors gave a mean response that suggests this area was not working well (3.28, SD, 1.24), although it should be noted that 92 of the 469 program directors (20%) chose not to answer this question. National discussions have tended to produce an awareness among participants and non-participants of the NRMP that having two separate processes may not serve senior medical students well.

Means were also calculated for the directors' responses regarding certain detailed aspects of the residency selection process. The program directors agreed that interviews should be flexible in order to accommodate interviewees' schedules (2.05, SD, 1.06). Comments provided by many directors indicated that they would like to be more accommodating to students' schedules; however, interviewing 80–100 candidates during a limited time span often precluded being more flexible.

When program directors were asked about the importance of determining marital status or family plans during the interview, the mean responses was more neutral (2.93, SD, 1.33). Several directors stated that these questions were illegal or they could not ask them of applicants, although the 1990 AAMC Medical Student Graduation Questionnaire showed that more than 35% of students reported being questioned about these issues. More than 38% of women applicants reported being asked about becoming pregnant during residency.

When asked to agree or disagree with the need for structured interview guidelines, the program directors disagreed (3.29, SD, 1.31). Some made comments, such as "Who would develop?" or "Let me make my own." Responses of the latter type perhaps indicate lesser understanding of the nature of structured interviews.[13,14] Such interviews undoubtedly appeared overly constraining for these directors' purposes. Discussion of interview questions at the 1990 AAMC Forum on the Transition from Medical School to Residency brought forward a request for the delineation of those areas of inquiry that are inappropriate. The directors were encouraged to develop their own criteria and devise appropriate question banks for each criterion, in order to increase both validity and reliability in the interview process.[15]

The directors gave more positive responses when asked about the importance of the dean's letter in selecting candidates (2.44, SD, 1.11) and in rank-ordering candidates (2.58, SD, 1.10). However, five directors commented, "get real," and three others said, "only with negative information." Moreover, when asked to agree or disagree that the dean's letter provides creditable information (2.72, SD, 1.00), or was of the appropriate length (2.72, SD, 1.00), or had the appropriate content (2.78, SD, 1.01), there was less of a general perception that the dean's letter worked well. These responses continue to reaffirm the need for increased improvement in deans' letters. A substantial number of directors commented on the high degree of variability in these letters, thus making generalizations about their usefulness difficult. Other comments provided by program directors stated that deans' letters were "too non-critical," "too vague," "too diffuse," or "too often selling students." Since the questionnaires were distributed before the release of dean's letters, we were unable to discern the effectiveness of the AAMC's recommended guidelines on deans' letters.

The program directors responded that letters of recommendation from three faculty were sufficient (1.87, SD, 0.91). However, to the statement that faculty letters were important in the selection process, the directors gave a more neutral response (2.49, SD, 1.00). A comparable mean was obtained regarding the importance of faculty letters in the ranking of students (2.53, SD, 1.01). The credibility of these letters as important source documents produced a similar outcome (2.66, SD, 0.98). Several directors commented that, like deans' letters, these letters were very good when the letter writers knew the students well. The program directors tended to have a more neutral position on having one of the three faculty letters be from a chairman (2.73, SD, 1.33), with comments like "How

many students really know chairmen?" Letters outside of the student's specialty were considered to be less helpful (2.84, SD, 1.04).

The use of cognitive data, such as NBME comprehensive Part I and Part II examination scores, MCAT scores, and SAT or ACT scores, in the residency selection process was assessed. When the directors responded to the statement that Part I scores assisted in candidate selection, the mean response was close to neutral (2.82, SD, 1.10). When responding to the statement that Part I scores correlated with residency performances, there was even less agreement (3.07, SD, 1.01). Since not all students take the fall administration of Part II, the scores are not available at the time of interview or ranking. The mean response to the statement that Part II scores assisted in the selection process (2.84, SD, 1.00) was similar to the response for Part I scores. Since there was more agreement among directors that residency performance correlated with Part II scores (2.78, SD, 0.95) than with Part I scores, the program directors might have felt that Part II scores would have been more valuable if they had been uniformly available at the time of selection. Use of the MCAT in the selection process has been occurring in some surgery specialties, and thus for those who used it, it was ranked highly; the weight of all others who did not use it, however, lowered the mean response to the statement that MCAT scores assist in candidate selection (3.95, SD, 1.01). The program directors agreed about the lack of usefulness of SAT or ACT scores in assisting in candidate selection (4.11, SD, 0.97). However, even with the strong agreement about their not being useful, some responses indicated that there were apparently program directors who used these data.

Table 3 provides the results of the program directors' ratings of suggested changes in the residency selection process, particularly those changes concerning the introduction of new technology and the development of a new, centralized residency application service (RAS). Regarding the desirability of the RAS, the directors' mean response was 2.70, SD, 1.08; for interviews to be scheduled by a computer center, the mean was 3.49, SD, 1.30; and for the application process to use modern technology, the mean was 2.74, SD, 0.98. Similar support was expressed for letters' being sent electronically (2.67, SD, 1.21) and for supplemental questions to be developed by individual programs (2.52, SD, 1.10). The area of strongest agreement was with the statement that the RAS should provide transcript verification (2.30, SD, 1.16). The program directors believed that the unmatched-student process could

Table 3

Mean Ratings and Percentages of Responses Concerning Possible Revisions to the Residency Selection Process, as Reported by a National Sample of 469 Program Directors in the 1990–91 NRMP*

Item	% Respondents Giving Rating					Mean Rating	(SD)
	Strongly Agree: 1	Agree: 2	Neutral: 3	Disagree: 4	Strongly Disagree: 5		
Residency application service (RAS) should verify transcript for programs	29	35	20	11	6	2.30	(1.16)
With verification, RAS should send final transcripts to programs	22	36	24	11	8	2.48	(1.17)
Unmatched students could be handled by RAS	25	30	23	13	9	2.51	(1.25)
Supplemental support questions could be developed by individual programs	18	33	34	8	7	2.52	(1.10)
Applicants should be linked to RAS by computer	17	37	28	12	7	2.56	(1.11)
By Dec. 1 applicants should be notified whether they will receive interview	24	31	17	17	11	2.60	(1.31)
Courses and grades should be added to the Universal Application (UA)	19	30	25	17	8	2.64	(1.20)
Letters should be sent via computer to programs	18	31	28	13	11	2.67	(1.21)
RAS is desirable	12	36	31	14	8	2.70	(1.08)
Application process should use modern technology	8	36	33	19	4	2.74	(0.98)
Curriculum vitae information should be added to UA	18	30	21	19	11	2.75	(1.27)
Applicants receiving interview should be notified by a set date	20	30	20	18	13	2.76	(1.32)
Applicants should be interviewed during a six-week period	15	20	15	27	24	3.24	(1.40)
Interviews should be scheduled by a computer center	9	16	19	28	28	3.49	(1.30)

*In July 1990 the authors conducted a nationwide survey of program directors participating in the National Resident Matching Program (NRMP) in order to solicit the directors' responses to elements of the current residency selection process and to suggested revisions. Of 680 randomly selected directors, 469 (69%) responded to the authors' questionnaire. The table above shows the directors' responses — in order of strength of agreement — regarding suggested changes in the process, particularly those involving the development of a new, centralized residency application service. All percentages are rounded.

be handled by the RAS (2.51, SD, 1.25), although many of them commented that the dean of students needed better information about program openings.

The program directors provided responses that tended toward neutrality when they were asked about future changes regarding the interview process (also shown in Table 3). Notifying all applicants no later than December 1 about whether they would be interviewed was seen as somewhat problematic (2.60, SD, 1.31). Several directors commented that this was too rigid a time frame and that for programs receiving hundreds of applications, particularly from non-U.S. students, it was not possible to review these in such a short time span. Several directors noted that adhering to this deadline would be possible only if November 1 was set as the date for receipt of all applications. When asked about interviewing all students over a six-week period, the program directors were far less supportive of this change (3.24, SD, 1.40). A typical comment from a director indicated that this time frame would "kill us and the students." Others said that they "wouldn't have enough faculty to do the job." Several stated that "eight to 12 weeks would suffice."

As shown in Table 3, a suggestion for adding courses and grades to the Universal Application received a mean response of 2.64, SD, 1.20, and a suggestion to add data from curricula vitae to the Universal Application received a mean response of 2.75, SD, 1.27.

Conclusions and Recommendations

There are many reasons to consider revision of the residency selection process, and we strongly recommend that the AAMC convene a task force on graduate medical education that would include program directors, residents, deans of students, and current senior medical students in order to consider selection process issues. The current cost of education, the need to use the senior year wisely, the inability of students to have budgeted dollars for interview travel, the relative values of the various kinds of information provided by the schools and their students in support of the interview or ranking process, and the unmatched-student process all need to be viewed with an eye for change. Considerable advances in technology have now opened areas of exploration that were not available previously. Based upon the analysis of the results of this study, we recommend that the task force consider the following:

1. The development of a residency application service (RAS) that would receive copies of a modified Universal Application located on computer disks at students' schools. An official password for each student would enable the student to enter only his or her own data at a computer terminal. For those who do not have access to a computer terminal, paper applications would be submitted to RAS. Grades would be listed on the application, and the student would be required to submit an official transcript from the medical school. The RAS would verify transcript information. The application process would have deadlines set by programs.

2. The verified application would then be forwarded to programs electronically by the RAS, or paper copies would be sent to programs that did not have modem capabilities. Each program would send to applicants (either to prescreened candidates only or to all) supplemental materials and a request for photograph (optional), additional questions particular to the specialty, and some notation of the program's interview schedule.

3. When requested, a school would electronically transmit or mail letters of support to the programs where the student was being considered. The dean's letter would likewise be transmitted or mailed at the appropriate release date to the same programs.

4. The program would directly notify each candidate whether he or she would be interviewed, during an eight-week period, and would provide the candidate with a code to contact a centralized computer service to reserve an available interview time. This process would be similar to that offered by airlines or hotels. Once a time is selected, a confirmation notice would be mailed to the candidate by the program. This should enable program directors and students to have scheduling control over the interview process.

5. A new system to simplify the appointment of the unmatched student to an unfilled program position must be developed. After receiving notification of an unmatched student, the school would electronically transmit the dean's letter and three faculty letters of recommendation to the RAS, thereby creating a complete file for every unmatched student. Unmatched students would be expected to indicate to the RAS those programs to which they wished to apply. Over a predetermined period of time, the RAS would electronically transmit the student's complete application file to the appropriate programs. After a nationally agreed upon period of time, program directors would electronically transmit their rank-ordered lists of candidates to the RAS. A second match would be run, and programs and students would be required to accept positions obtained through this process. Any remaining unmatched students would be provided a list of openings to contact.

These proposals would significantly expedite the residency selection process by eliminating redundant paperwork, and they would ease the timely transmission of information. The Canadian Match System, although operating with many fewer applicants, uses a centralized application process. Undoubtedly lessons could be learned from their experience. The realization of our proposals would have to take into account many independent applicants in addition to U.S. medical students. Although the complexity of the change being proposed is sizeable, it seems propitious that change be considered at this time, and it is certain that a large number of people would stand to benefit.

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Effects of Tutors with Case Expertise on Problem-based Learning Issues

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Abstract—At the University of Calgary Faculty of Medicine in 1991, the authors sought to determine the effects of tutors' levels of content expertise on learning issues generated within problem-based learning (PBL) tutorials. For an integrative course taken prior to clinical clerkships, the 70 students in the class of 1992 divided into ten small groups, which were facilitated alternately by content experts and non-experts. The authors found that—across 35 simulated-patient case encounters (24 with non-experts and 11 with experts)—when the groups had tutors with expertise in the clinical cases studied, the groups generated approximately twice as many learning issues per case, and these issues were approximately three times more congruent with the case objectives. In addition, when the groups had expert tutors they spent approximately twice as much time per case in overcoming identified learning deficiencies. The authors conclude that it is important for tutors (1) to be well informed about cases and case objectives and (2) to be well versed in the PBL tutoring process. *Acad. Med.* 67(1992):465–469.

Traditionally, in small-group learning, tutors are expected to be experts in the process of small-group facilitation but not necessarily in the content of the problem to which a solution is sought. A successful group is one that can purposefully proceed without constant intervention by the tutor. In managing a small group, a tutor has to consider the task and the maintenance of the group. The task must be clearly defined and each participant's role must be understood by all members in the small group. The maintenance of the group involves establishing a "climate" for discussion that is open, trustful, and supportive. Small groups can take on different structures: one-to-one discussion, "buzz" groups, brainstorming, role playing, plenary session, and evaluation discussion.[1] Recently, the structure of small groups has been extended to include problem-based learning (PBL).

Barrows and Tamblyn,[2] in their elaborations on PBL, state that a tutor must understand the process of clinical reasoning and must be skilled in facilitating small-group learning. Throughout the PBL process the tutor helps the students identify their learning needs and assists them in setting the priorities of the program objectives and personal learning issues. Barrows[3] also states that the

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Another article about small-group learning and tutors' content expertise appears on page 470.

A commentary about the value of tutor content expertise in problem-based learning appears on page 454.